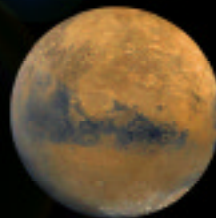


Really Advanced Propulsion Research

Presentation to
The Florida Chapter
Of The
American Institute of Aeronautics and Astronautics

By
John Cole
Manager, Space Transportation Research
Marshall Space Flight Center

January 2000





Really Advanced Propulsion Research



■ Contents

- **Objectives, Scope and Avenues for research**
- **Safety First**
- **Measures**
- **Advanced Chemical Concepts**
 - Engines (RBCC, LACE, DCARE, PDRE, Gun Launch)
 - Advanced Fuels (HC, exotic)
- **Electromagnetic**
 - Launch Assist
 - MHD and AJAX type concepts
 - High Power Electric Engines
 - Laser Lightcraft
 - Microwave Lightcraft
 - Thethers
 - Sails
- **Advanced Nuclear**
 - NTR, NEP, High T Fuels
 - LANTR
 - ABCC, Pluto, Nuclear Ramjet
 - An aneutronic concept
 - ORION
- **Fusion and Antimatter**
 - NSTX, Magnetic Nozzles
 - Gas Dynamic Mirror
 - Magnetized Target Fusion
 - Dense Plasma Focus
 - Antimatter
- **Interstellar**
 - Distances
 - Concepts
- **Breakthrough Propulsion Physics**
 - Gravity Modification
 - Faster than light travel
 - NRA selected research



Objectives, Scope and Avenues for Research



■ Objectives of this Presentation

- To briefly discuss some of the current advanced propulsion research
- What it is, how it works, expected benefits, and who is doing it.

■ Research Objectives

- Significantly improve safety and cost of space transportation
- Reduce trip time for in-space missions
- Enable new missions

■ Scope of potential mission applications include Earth to orbit, In-space transfers, Interplanetary, and Interstellar precursors

■ Avenues

- Advanced Fuels and Cycles
- Use of Off-Board Resources

■ Most of these concepts are 30 - 40 years old, but now we have new materials and analysis tools

